

REMARKS

Claims 8, 18, 26, 32 and 34-37 have been cancelled. Claims 38-45 have been added. Accordingly, the claims remaining in the application are claims 1-7, 9-17, 19-25, 27-31, 33 and 38-45.

In the Communication mailed from the Patent Office on March 19, 2004, the Examiner indicated that claims 8, 18, 26 and 32 were objected to. Accordingly, these claims have been cancelled and replaced by claims 38-41 which present the cancelled claims in independent form. Thus, claims 38-41 should be allowable.

New claims 42-45 are dependent from new claims 38-41, respectively. Accordingly, claims 42-45 also should be allowed.

The Rejections

- I. Claims 34-37 have been rejected under 35 USC 102(b) as being anticipated by Hulme of record or Moulton of record.

Since claims 34-37 have been cancelled, this rejection is now moot.

- II. Claims 1-11 and 22-27 have been rejected under 35 USC §103(a) as being unpatentable over Moulton U.S. 6,217,743 in view of Hulme U.S. 5,968,338.

The Examiner acknowledges that Moulton does not disclose that the second bipolar membrane and the cathode form the compartment adjacent to the cathode. The Hulme patent is cited by the Examiner to show that such an arrangement of first and second bipolar membranes and cation membranes, wherein the compartment adjacent to the cathode is formed by a second bipolar membrane and a cathode (see FIG. 5).

Consequently, the Examiner concludes that the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of the Moulton patent with the teachings of the Hulme patent because the Hulme patent discloses that such arrangement of membranes allows the formation of a purified solution of onium hydroxide. Reconsideration and withdrawal of this rejection is solicited.

Applicants agree with the Examiner's statement of the test of obviousness found on pages 4-5 of the Communication of March 19, 2004, namely,

The test is what the combined teachings of the references would have suggested to those of ordinary skill in the art, citing *In re Keller* 642 F2d 413, 208 USPQ 871 (CCPA 1981).

Thus, the "teachings of the references" must be considered, and then what one skilled in the art would conclude from a combination of these teachings. Applicants respectfully submit that the combination of the teachings would not result in the process of the present claims.

Both Moulton and Hulme describe and claim processes for recovering organic hydroxides from "waste solutions containing onium compounds" defined as onium hydroxides and/or onium salts (Moulton column 6, lines 53-56, Hulme column 3, lines 65-67). After removing metal ions with the aid of a metal ion scavenger, Moulton charges the waste solutions to the electrochemical cells described therein. Although Moulton et al describe a significant number of types of cells, there is no electrochemical cell wherein the compartment adjacent to the cathode is formed by a second bipolar membrane and the cathode.

Although Hulme et al is concerned with recovering onium hydroxides from waste solutions, Hulme teaches that the waste solution is first treated with a cation exchange material and an acid to convert the waste solution to a solution of onium salts, and it is the onium salt which is charged to the electrochemical cell. Accordingly, any modification of the disclosure of the Moulton patent based on the teachings of the Hulme patent would be the use of an onium salt in the process described in the Moulton patent. Even if it would be obvious to modify the cells described by Moulton to include a compartment adjacent to the cathode that is formed by the second bipolar membrane in the cathode (as described in Hulme), there is no teaching or suggestion in Hulme that would make it obvious to modify the cells described by Moulton and to charge an aqueous onium hydroxide solution to the modified Moulton electrochemical cell. In fact,

Hulme teaches that the waste solution containing an onium hydroxide must be treated to convert the onium hydroxide in the solution to an onium salt before it can be subjected to the electrolytic process described by Hulme. Accordingly, the rejection of claims 1-11 and 12-27 is improper and should be withdrawn.

III. Claims 12-21 and 28-33 have been rejected under 35 USC 103(a) as being unpatentable over Moulton '743 in view of Shay U.S. 5,833,832.

These rejected claims are directed to electrochemical cells comprising at least five compartments wherein the compartments are formed by, in order from the anode to the cathode, a first bipolar membrane, a first cation selected membrane, a second cation selected membrane and a second bipolar membrane (BCCB configuration). The Examiner acknowledges that Hulme does not show the BCCB arrangement of the membranes as recited in the rejected claims, but the Examiner notes that Hulme does teach that one of ordinary skill in the art would find it readily apparent that additional numerous embodiments not specifically described in the figures exists within the scope of the invention (see column 12, lines 8-15).

The Shay patent is relied upon by the Examiner for showing an embodiment that “encompasses the claimed electrochemical cell having a first and second bipolar membrane having first and second cation membranes within the bipolar membrane (see FIG. 6)” at page 5 of Paper No. 3.

Thus, the Examiner concludes that the invention as a whole would have been obvious to one of ordinary skill in the art by modifying the disclosure of the Hulme patent with the teaching of the Shay patent.

The Examiner is respectfully requested to reconsider and withdraw this rejection because even if the disclosures of the two references are combined, the result is not a process utilizing an electrochemical cell as currently specified in the claims.

As noted above, the configuration of the electrochemical cells containing at least five compartments utilized in the rejected claims are illustrated as BCCB (FIG. 2) or BCCBCCB, (FIG. 3).

Shay et al does not illustrate or describe any electrochemical cell containing two bipolar membranes wherein the configuration beginning at the anode is BCCB. The Figures in Shay wherein electrochemical cells are illustrated containing two bipolar membranes describe different configurations: FIG. 2C describes an electrochemical cell having a configuration of BACBAC; FIG. 4 illustrates an electrochemical cell having a configuration of BACB; FIG. 4A illustrates an electrochemical cell having a configuration of BACBBACB; and FIG. 6 (relied upon by the Examiner) illustrates an electrochemical cell having a configuration of BACCB.

Accordingly, Applicants respectfully submit that there is no teaching or suggestion in Shay et al of any electrochemical cell having the configuration specified in the rejected claims. Accordingly, even if the electrochemical cells described by Shay were substituted for the electrochemical cells described by Hulme, the combination would not result in a process utilizing an electrochemical cell as utilized in the process of the present claims. Accordingly, withdrawal of the rejection of these claims is believed to be in order.

CONCLUSION

In view of the above amendments and the above comments, Applicants respectfully submit that all of the claims remaining in the application are allowable. An early action to this effect is solicited.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By Armand P. Boisselle
Armand P. Boisselle
Reg. No. 22,381

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113